

May 19, 1978

Memo to File:

Re: ACT/053/002
5-M, Inc.
Silver Reef Mines

On May 11, 1978 Brian Buck and Jim Smith met with Mr. Jerry Glazier, Ted Sorensen and A.H. Rasmussen from 5-M. Also present by Division invitation was Mr. Bill Dallness and Ms. Sue Cedarleaf from the Cedar City BLM Office and Mr. Vern Tronowski from the Bureau of Radiation and Occupational Health, Division of Health.

The participants were shown around the entire property in order to get a general opinion as to the current land status and effects of the proposed operation. The entire area of the operations is intricately laced with the accumulated disturbances of over 100 years of mining activity. In existence are disturbances related to over 100 portals and shafts, numerous small open pits, five (5) miles, and many drill holes. 5-M now controls most of the district and intends to engage in extensive strip mining and on-site heap leaching of silver and copper ore. They are also applying in their permit for permission to mine uranium/vanadium ore. Their heap leaching system would also be applied to the uranium ore but they will require NRC approval to do this.

The uraniferous ore occurs only in the eastern areas of the permit area on what is known as Pumpkin Point, Paulmer Hill, and Tecumseh Hill. The silver/copper ore occurs mainly on the White Reef and to some extent everywhere else on the property.

The White Reef ore is contained in the Techumseh/Leeds strata which form the white, resistant, sandstone cap of the White Reef and Buckeye Reef. This unit is about 100 feet thick and would be stripped off the entire dip-slopes of the reefs exposing a reddish-brown, shale and sandstone unit known as the Trail Hill member. The present dip-slope surfaces of the reefs are rock with very little soil or vegetation ~~soil~~ very little soil can be stockpiled. The open pits would extend some 50' beyond the base of the dip slopes into the alluvium which could possibly be spread out as top soil. The pits will be operated as continuous haul-back operations so that waste rock from the initial 1000' x 300' pit would be temporarily stored on the alluvial flats while waste from the second similarly sized pit would be directly placed in the first pit and so on down the entire lengths of the reefs. The waste rock from the initial pit would be replaced into the first and subsequent pits as space allows. As the footwall of the pits is exposed it will be terraced with numerous narrow terraces as is practiced by the DOT in the highway cuts. This will help key the replaced waste rock into the slope which is inclined at an average dip of 30°. The waste rock will be placed so as to be thicker at the bottom of the slope and tapering towards the top. The alluvium would be spread over the

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waste rock and only the uppermost reaches of the slope will expose the pit footwall surface.

The continuous reclamation of the open pits will be suspended in some localities to allow access to the ore zone for portals in the pit bottoms. This will allow further underground development of the mine.

The uranium ore is not as widespread as the copper/silver ore and will be developed with smaller pits and underground mines to take advantage of the spotty higher grade pods of ore.

The ore will be crushed and placed in specially lined basins for heap leaching with sulphuric acid. This leachate will be scrubbed of its mineral value to produce metal salts for sale and the cleaned acid solution will be returned to the ore piles. The system will be fully closed and maintained so as to prevent accidental release of the fluids. As an ore pile is leached out another one will be constructed to take its place. After leaching, the piles will be compacted and covered with waste rock and soil. The present plan is to build successive leach basins up gradient in a canyon immediately to the east of the White Reef. Each basin would be so constructed so as to contain all runoff from the drainage above it. The drainage area is small but should be checked for the PMTS. Two (2) complications exist; one, is that just to the north of the canyon is a developing residential area and; two, a culinary water well exists just downstream from the leach pond area. 5-M is presently attempting to buy the water well. Presently, the first basin is being constructed.

A number of problems exist in approving this project:

1. The uranium leaching will be conducted in the drainage and the possible flood effects will have to be contended with.
2. Because the uranium circuit is on-site, the Division has authority over its operation in conjunction with the NRC. The design and reclamation standards of both agencies will have to be in concert.
3. The operations as described fail to explain where underground mine waste is to be dumped, nor is the establishment of a stable drainage channel over the reclaimed leach piles explained.
4. 5-M wants to have surety calculated for over 1,300 acres initiated for 30 years which probably will total over 3 million dollars. It would be more reasonable to be more specific as to how much disturbances of various natures will exist at any one time.

BRIAN W. BUCK *BWB*
ENGINEERING GEOLOGIST